TIGER* Pathogen Detection Sensor

***Triangulation Identification for Genetic Evaluation of Risks**

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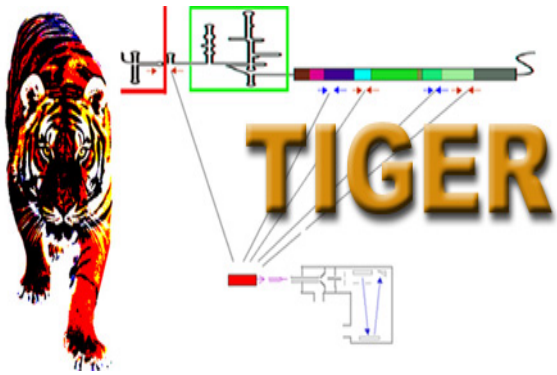
Goal: *Develop a medical and environmental bio-surveillance sensor to detect all known, newly emergent, or bio-engineered pathogens with high sensitivity and specificity resulting in very low false alarm rates.*

TIGER Missions and Capabilities

- **Medical & Environmental Bio-surveillance**
- **Forensics**
- **Detect Unknown Infectious Threat Agents**
- **Effective Against Complex Biological Mixtures**
- **Pathogen Identification From Digital Signatures**

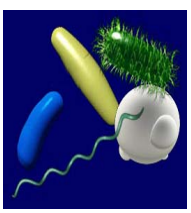


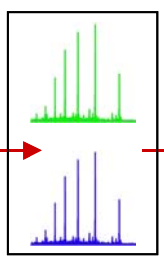
Fusion of advanced genomic & signal processing techniques

Description:

The TIGER program objectives are to build a universal sensor to detect all known, newly emergent, or bio-engineered pathogens with high sensitivity and specificity and very low false alarm rate. The TIGER sensor is based on PCR with primers pairs anchored to universal sites and amplifying species-identifying variable regions. High resolution mass spectrometry followed by maximum-likelihood detection processing are used to analyze the PCR products, identify the pathogenic and background organisms present, and estimate the quantity of each organism in the sample.

TIGER Pathogen Detection Process





Organism	Mass	Base Count
E. coli	18234.970	$A_{12}G_{17}C_{17}T_{13}$
S. milleri	17948.926	$A_{14}G_{14}C_{12}T_{18}$
M. leprae	18610.017	$A_{11}G_{19}C_{15}T_{15}$
Unknown brucella	17936.912	$A_{11}G_{17}C_{16}T_{14}$
T. medium	18877.118	$A_{18}G_{15}C_{15}T_{13}$

Input Sample → PCR Amplify → Hi-Resolution Mass Spectra → Signal Processing → Pathogen ID